PATENT APPLICATION

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TITLE OF THE INVENTION

"Rescue Boat"

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CROSS-REFERENCE TO RELATED APPLICATIONS

Priority of US Provisional Patent Application Serial No. 60/419,047, filed 16 October 2002, incorporated herein by reference, is hereby claimed. Also incorporated by reference are all papers attached to and filed with US Provisional Patent Application Serial No. 60/419,047.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

The invention was developed under Textron IRAD.

REFERENCE TO A "MICROFICHE APPENDIX"

Not applicable

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to water craft. More particularly, the present invention relates to an improved water craft particularly adapted to perform shallow water rescue operations.

2. General Background of the Invention

Rescue vessels are often needed to perform rescues in relatively shallow water. Thus, there is a need for a rescue vessel that can be used by state and federal agencies to rescue boaters in distress and in relatively shallow or coastal waters.

Shallow water rescue (between about 3 and about 8 feet (about 0.91 and about 2.44 m)) requires a vessel that has minimal draft and yet can rescue victims even if

they are badly injured, requiring a stretcher or litter. Such a craft desirably has a deck configuration that is compatible with helicopter rescue using a hoist. In some situations, a helicopter must be able to hoist a litter or stretcher from the vessel. A boating accident victim that suffers trauma may be in immediate need of emergency care. There is also need for a vessel that can rescue multiple persons, some requiring a stretcher or litter as part of their medical care.

BRIEF SUMMARY OF THE INVENTION

The present invention provides a rescue boat of improved configuration. The rescue boat of the present invention has a hull with an upper deck area that includes bow and stern areas.

The hull has a propulsion system for propelling the hull. The hull can be a constant dead rise (monohedron) hull having developable surfaces giving efficient performance and enhanced manufacturability. Yaw stabilizing skegs are located within a shallow draft hull profile. Large spray rails can be provided for spray minimization and added hydrodynamic lift.

A highly resistant fender system is provided for hull protection and added emergency buoyancy. The hull thus carries a bumper or fender that is attached to the hull next to the deck. This bumper or fender can contribute for example at least one ton (0.907 metric tons) of positive buoyancy should the hull become submerged, and preferably between about one and about three tons (about 0.907 metric tons and about 2.72 metric tons) of buoyancy. For example, it can provide 1.8 tons (1.63 metric tons) of positive buoyancy.

A pilot house may be mounted on the hull at the upper deck and extending above the upper deck area generally amidships. The pilot house provides a pilot house deck, a front, a rear, and side portions.

A pair of rescue wells define recesses in hull below the upper deck and inside of the hull port and starboard sides, each rescue well having a length. A majority of the length of each rescue well is preferably positioned in front of the rear of the pilot house. Dual control stations (e.g. port and starboard chairs) are provided (preferably inside the pilot house) so that an operator can control the vessel while viewing either the port or the starboard rescue well.

The present invention thus provides a rescue boat of improved configuration and layout having optimized operator field of view for rescue. Redundant steering controls can thus be provided. These controls can include, for example, standard helm manual pump type and secondary helm fly by wire type. Crew seating can optionally employ dynamic energy absorbent seating to reduce fatigue.

The rescue wells are preferably each positioned in front of the deck stern area. The pilot house preferably has multiple seating positions including at least port and starboard positions. The rescue wells preferably extend in front of and behind the seating positions.

The pilot house provides 360-degree close-in visibility for a pilot that occupies either one of the seating positions (port or starboard) and that enables the pilot to see the water in front of the hull a distance that is less than the length of the hull.

The stern deck area provides an enlarged unobstructed deck space with multi-role functionality, giving a helicopter litter interface that enables a helicopter to airlift a cable hoisted package (e.g. stretcher or litter) from the stern deck loading zone. The stern deck has one or more hatches that allow fresh air and natural lighting into the engine room for dockside maintenance. These engine hatches can be equipped with quick acting quick release handles that do not require tools so that the engine hatches can be quickly opened.

The hull may carry a litter. This litter for carrying an injured person can be fitted into multiple areas on the hull including at least one of a pilot house deck, a passenger compartment, and/or the stern deck area. The pilot house is preferably sized and shaped to fit a litter in between the seating positions. In the preferred embodiment, the hull provides a passenger compartment having a passenger compartment deck that is below and in front of the pilot house deck. The passenger compartment deck is preferably sized and shaped to receive and contain a litter.

The hull has a bottom, the propulsion system being positioned above the bottom of the hull. The propulsion system preferably does not have an exposed propeller. The propulsion system preferably includes two or more propulsion units. The propulsion system preferably includes water jet propulsion which is shallow draft, produces high speed maneuverability yet affords good swimmer safety.

Standoff protection is provided for these water jets in the form of stern buoyancy chambers. The stern buoyancy chambers provide added reserve buoyancy, added planing lift during acceleration to keep the vessel nose down, as well as standoff protection when backing up near a dock or another vessel.

A fan tail may be provided at the stern that extends rearwardly beyond the propulsion units. The hull preferably has one of the buoyancy chambers positioned in between the propulsion units. This center buoyancy chamber extends behind the transom. Multiple other buoyancy chambers or tanks can be provided, at least one that extends behind the transom.

A hoisting arrangement is provided under the fan tail portion of the hull to facilitate water jet maintenance.

Integral hoist fittings and flush trailer tie-down fittings prevent fender damage during hoisting and due to tie-down lashings when trailering.

A high strength towing post can be mounted at the vessel stern next to the edge of the stern deck area giving enhanced tow capability. Integral gun mount receptacles can be mounted at the stern deck area and at the forward deck area in front of the pilot house and passenger compartment if the vessel is to be engaged in law enforcement activity. When the engine hatches are open, the engine room layout allows for quick checks of propulsion machinery even from the deck area if necessary.

Other features that can be provided to the rescue boat of the present invention include provision for the use of external onboard pump for auxiliary bilge suction and for offboard fire fighting. Night vision capability can be provided to enhance round the clock rescue functionality. The rescue boat of the present invention can be provided with "quick response from the dock" features such as keyless operation and electrical systems designed for rapid change over from shore to ship power.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

For a further understanding of the nature, objects, and advantages of the present invention, reference should be had to the following detailed description, read in conjunction with the attached drawings which are identified as follows:

Figure 1 is a side elevation view of the preferred embodiment of the apparatus of the present invention;

Figure 2 is a plan view of the preferred embodiment of the apparatus of the present invention;

Figure 3 is a partial perspective view of recovery well;

Figure 4 is a side sectional, elevation view of the preferred embodiment of the apparatus of the present invention;

Figure 5 is a plan sectional, fragmentary view of the preferred embodiment of the apparatus of the present invention;

Figure 6 is another plan sectional view of the preferred embodiment of the apparatus of the present invention;

Figure 7 is a sectional view taken along lines 7-7 of Figure 5;

Figure 8 is a sectional view taken along lines 8-8 of Figure 6;

Figure 9 is a sectional view taken along lines 9-9 of Figure 6;

Figure 10 is a front elevation view of the preferred embodiment of the apparatus of the present invention;

Figure 11 is a rear elevation view of the preferred embodiment of the apparatus of the present invention;

Figure 12 is a side view of an engine attached to a jet pump; and

Figures 13 through 15 are side, rear, and front views of a preferred embodiment of the present invention loaded on a trailer.

DETAILED DESCRIPTION

Figures 1, 2, 4, 10 and 11 show generally the preferred embodiment of the apparatus of the present invention, designated generally by the numeral 10. Marine rescue vessel 10 includes an elongated hull 11 having an upper deck 12. Vessel 10 has a bow portion 14 and a stern portion 15. Pilot house 13 can be mounted upon and extend upwardly from deck 12 of hull 11. Hull 11 has a port side 16 and a starboard side 17.

A passenger compartment 18 can be provided that extends in front of pilot house 13. The passenger compartment 18 can have a passenger compartment deck 48 that is in front of and preferably at an elevation lower than upper deck 12 at pilot house 13 (see Figures 2, 4-9).

A pair of recovery or rescue wells 19, 20 are provided in hull 11 amidships, on opposing sides of pilot house 13 as shown in Figures 1-3. These recovery wells

include port recovery well 19 and starboard recovery well 20. Each recovery well (Figure 3) has a floor 68 and side walls 69, 70, 71. Grating section 35 can be positioned at about the level of deck 12 to provide a walkway across the top of each rescue well 19, 20. During a rescue, grating section 35 can be removed as indicated schematically by arrow 36 in Figure 3.

Deck 12 can include aft deck 21 that is preferably an exposed deck providing an enlarged area for helicopter recovery of a stretcher or litter 50 (see Figures 2 and 4). A helicopter can use its hoist for enabling injured persons to be air-lifted from aft deck 21 using a hoist lift line 44. Such a lift line 44 that is operated by an electrical lift of a helicopter is known. A high strength towing post 45 can be mounted at the vessel stern next to the edge of the stern deck area giving enhanced tow capability.

The marine rescue vessel 10 of the present invention thus provides a shallow draft rescue vessel 10 that enables persons on a stretcher 50 to be air-lifted from aft deck 21 if such person (or persons) needs immediate emergency medical care (see arrows 49, Figure 4). The aft deck 21 provides a pair of hatches 22, 23 that are flush with aft deck 21 when they are in the closed position shown in Figures 1, 2 and 4. Each hatch, 22, 23 can be opened to expose an engine 46 (or engine/transmission) portion of the propulsion units 38, 39.

Pilot house 13 has a pilot house rear portion 24, a pilot house forward portion 25, roof 26, and an interior 47 that holds a plurality of crew chairs 28, 29, 30, 31. Preferably, there are two crew chairs 28, 29 on the port side 16 of hull 11 and two crew chairs 30, 31 that are on the starboard side 17 of hull 11 and all within pilot house 13. A mast 27 carrying selected electronics can be mounted upon roof 26. Roof 26 can carry other instrumentation.

Mast 27 can be folded, repositioned, or recessed (Figure 13) for minimum navigational height, or readily removed, for transport via trailer 72 (see Figures 13-15) providing an overall height (trailer plus vessel 10) that will fit the combination under interstate highway overpasses (e.g. 13.5 feet (4.11 m) maximum). Straps 73 can be used to hold vessel 10 to trailer 73. Tie-down fittings are preferably built-in and flush with hull 11 so that they are not subject to damage in normal service and they do not require conventional tie-down straps over the fenders 64, 65 during

trailering. Likewise, any hoist fittings extend above the deck to allow use of lifting cables instead of bellybands to prevent fender damage.

Aisle 32 enables a stretcher 50 to be positioned inside pilot house 13 if the outside conditions are inclement. In addition to placing stretcher 50 on aft deck 21 or in aisle 32 of pilot house 13, there is a third position for receiving a stretcher 50. In Figures 2, 6 and 8, stretcher 50 can be placed upon the passenger compartment seats 54 as shown in Figures 2, 4, 6 and 8.

A stairway 51 extends from aisle 32 to passenger compartment 18 and its deck 48 as shown in Figure 4. This improved configuration of the present invention enables a stretcher 50 carrying an injured person 52 to be put in multiple positions in event of a severe marine accident that injures multiple persons 52. In a situation wherein additional passengers 53 are rescued, those passengers 53 can occupy the seats 54 of passenger 18 as shown in Figures 4-9. Multiple of the seats 54 can fold to the folded position designated generally by the numeral 55 in Figure 6. When not in use, the stretcher 50 can be folded and stored in receptacle 56 as shown in Figures 5 and 9.

In Figures 4, 11, and 12 the pair of propulsion units 38, 39 each include an engine portion 46 and a jet pump portion 57. Engine 46 and jet pump 57 are commercially available. In Figure 4, the jet pump 57 of each propulsion unit 38, 39 is positioned above keel 34 at transom 33. In this fashion, there is no portion of either propulsion unit 38 or 39 extending below the hull 11 keel 34 so that very shallow rescue operations can be conducted without damaging a propulsion unit 38, 39. Further, one or more buoyancy tanks or chambers can be mounted to the hull 11 at stern 15. In Figures 4 and 11, these chambers can include a center buoyancy chamber 37, port buoyancy chamber 40 and starboard buoyancy chamber 41. Hull 11 also includes fan tail section 42 that extends rearwardly of transom 33. In the preferred embodiment, each of the buoyancy chambers 37, 40, 41 connects to and extends downwardly from fan tail section 42. In Figures 12 and 14, lifting rails 74 (e.g. channel beam, I-beam transverse shape) can be mounted to the undersurface 77 of fan-tail 42. A suitable hoist 75 can be removably attached to a selected one of the rails 74 when an outdrive jet pump 57 is to be removed for servicing. In Figure 12,

arrow 76 schematically illustrates the removal of an outdrive jet pump 57 part of a propulsion unit 38, 39 using hoist 75.

The center buoyancy chamber 37 has a lower surface 43 and aft surface 58 and sides 59, 60. The surface 43 helps during take off by insuring that the hull 11 can be powered to a planing position. The rear surface 58 in combination with fan tail section 42 protect the propulsion units 38, 39 from damage when the vessel 10 backs up during rescue operations or when docking.

Hull 11 provides port and starboard spray rails 61 and skegs 62. The skegs 62 do not extend below the keel to enable the hull 11 to go into very shallow water. The skegs 62 also help stabilize the vessel when it is on the plane. Aft deck 21 can be surrounded by railings 63. An enlarged polymeric bumper 64 can be provided at the interface between hull 11 and deck 12 as shown in Figures 1, 2, 3, 10 and 11. A smaller bumper 65 can be placed at each rescue wall 19, 20. The smaller bumper 65 can be best seen in Figures 1 and 3.

This enlarged bumper 64, 65 arrangement contributes substantial buoyancy should the vessel become partially submerged or fully submerged during rescue operations. As shown in Figures 1 and 2, the bumpers 64, 65 together substantially encircle hull 11. For a vessel 10 having a length of about 45 feet (13.7 m), positive buoyancy of between about one and about three tons (about 0.907 metric tons and about 2.72 metric tons) is contributed by bumpers 64, 65.

In Figure 1, a reference line 66 illustrates that a pilot occupying seat 28 or 30 on vessel 10 can see the water's surface 67 a distance in front of hull 11 that is less than the overall length of vessel 10.

The following is a list of suitable parts and materials for the various elements of the preferred embodiment of the present invention.

PARTS LIST

Parts Number	Description
10	marine rescue vessel
11	hull
12	upper deck
13	pilot house
14	bow

15	stern
16	port side
17	starboard side
18	passenger compartment
19	port recovery well
20	starboard recovery well
21	aft deck
22	port hatch
23	starboard hatch
24	pilot house rear portion
25	pilot house forward portion
26	roof
27	mast
28	crew chair
29	crew chair
30	crew chair
31	crew chair
32	aisle
33	transom
34	keel
35	deck grating
36	arrow
37	center buoyancy chamber
38	propulsion unit
39	propulsion unit
40	port buoyancy chamber
41	starboard buoyancy chamber
42	fan tail
43	bottom surface
44	lift line
45	towing post

46	engine
47	interior
48	deck
49	arrow
50	stretcher
51	stairway
52	person
53	passenger
54	seat
55	folded position
56	receptacle
57	jet pump
58	aft surface
59	side
60	side
61	spray rail
62	skeg
63	railing
64	fender
65	fender
66	reference line
67	water's surface
68	floor
69	side wall
70	side wall
71	side wall
72	trailer
73	strap
74	lifting rail
75	hoist
76	arrow

The foregoing embodiments are presented by way of example only; the scope of the present invention is to be limited only by the following claims.